1. (Currently amended) An anti-wear compound comprising:

reacting a first moiety with a second moiety in a molar ration of from about 1:2 to about 2:1 at a temperature of from about 220°C ~~22°C~~ to about 320°C under an inert atmosphere to form an intermediate adduct; and

esterfying the intermediate adduct with a third moiety in a molar ratio of from about 1:2 to about 2:1 wherein the first moiety is an unsaturated synthetic base oil or an unsaturated synthetic dieneophilic base oil, the second moiety is a structure having a diene conjugated carbon-carbon double bond and a carboxylic acid or anhydride moiety, and the third moiety is a polyhydroxy compound.

2. (Previously presented) The anti-wear compound of claim 1 wherein the unsaturated synthetic base oil or the unsaturated synthetic dieneophilic base oil is selected from the group consisting of unsaturated C_{12}-C_{50} alkenes, C_{12}-C_{50} dienes, naphthenic petroleum base stocks; unsaturated liquid oligomers and polymers, unsaturated polyalphaolefins, unsaturated polyacrylates, unsaturated dehydrated polyol esters; unsaturated C_{10}-C_{24} branched or straight chain fatty acids; unsaturated fatty esters having a branched or straight chain mono- or polyunsaturated C_{10}-C_{24} fatty acid esterified to a C_1-C_{24} straight or branched, saturated or unsaturated alcohol; unsaturated fatty glycol esters having a mono- or polyunsaturated C_{10}-C_{24} branched or straight chain fatty acid esterified to one or more hydroxyl sites of a polyol selected from ethyleneglycol, polyethyleneglycol, propyleneglycol, polypropyleneglycol, polyethoxylated alcohols, trimethylolpropane, pentaerythritol, dimethylolpropane, dipentaerythritol, and trimethylolethane; cyclopentene, cyclopentadiene, cyclohexene, cyclohexadiene, 3-pyrroline; substituted benzene, substituted tolune, substituted xylene, substituted quinone, substituted naphthalene, substituted anthracene, substituted pyrrole, substituted furan, substituted thiophene, substituted pyridine, substituted pyrimidine, substituted imidazole, substituted thiazole; X_1-ester-linked benzoic acid, X_1-ester-linked benzyl, X_1- ester-linked naphthenic, X_1-ester-linked phenol; a branched or straight chain mono- or polyunsaturated C_{10}-C_{24} fatty acid; and combinations thereof, wherein the substitution is a mono- or polyunsaturated C_2-C_{25} branched or straight chain alkenyl, wherein X_1-ester-linked is C_2-C_{24} straight or branched carboxylic acid side chains or a C_1-C_{24} straight or branched, saturated or unsaturated alcohols.

3. (Cancelled)

4. (Currently amended) The anti-wear compound of ~~claim 3~~ claim 1 wherein the second moiety is selected from a group consisting of sorbic acid, sorbic anhydride, salicylic acid, salicylic anhydride, C_{1-10} alkyl, C_{2-10} alkenyl, or C_{1-10} alkoxy derivatives of the foregoing acids and anhydrides, and combinations thereof.

5. (Original) The anti-wear compound of claim 1 wherein the polyhydroxy compound of the third moiety is selected from the group consisting of glycerol, sorbitol, hydroxyquinone, glucose, mannose, 6-carbon sugars, pentose, fructose, 5-carbon sugars, pentaerythritol, catechol, resorcinol, hydroquinone, pyrogallol, 4,4'-dihydroxybiphenyl, 2,4-dihydroxybiphenyl, 2,2'-dihydroxybiphenyl, orthohydroxybenzene, polyhydroxyaromatic compounds having one or two phenyl rings and one or two 5-6 membered aromatic rings having substituted alkyl or alkenyl side chains (C_{2-10}) substituted with at least two hydroxyl groups, trimethylolpropane, pentaerythritol, dimethylolpropane, dipentaerythritol, trimethylolethane, ethyleneglycol, polypropyleneglycol, polyethylated alcohols, and combinations thereof.

6. (Original) The anti-wear compound of claim 1 wherein the first reaction is conducted under continuous mixing.

7. (Original) The anti-wear compound of claim 1 wherein the esterification reaction comprises reaction conditions of from about 150 °C to about 230 °C under an inert atmosphere and further comprises adding an esterification catalyst.

8. (Original) The anti-wear compound of claim 7 wherein the esterification catalyst is an acid catalyst.

9. (Original) The anti-wear compound of claim 8 wherein the esterification catalyst is selected from the group consisting of p-toluene sulfonic acid, hypophosphorous acid, sulfuric acid, hydrochloric acid, phosphoric acid, acid-activated clays, solid acid catalysts, acidic zeolites, and combinations thereof.

10. (Currently amended) The anti-wear compound of claim 1 wherein the anti-wear compound is made from the first moiety, second moiety and third moiety compounds selected from the group consisting of respectively in order for each anti-wear compound trimethylol ~~trimethyol~~ propane trioleate–sorbic acid-sorbitol, trimethylol ~~trimethyol~~ propane trioleate–sorbitol-sorbate, and trimethylol ~~trimethyol~~ propane trioleate–sorbic acid-hydroquinone.

11. (Original) A process for synthesizing an anti-wear compound, comprising:

(a) reacting an unsaturated synthetic base oil or an unsaturated synthetic dieneophilic base oil first moiety with a second moiety in a molar ratio of from about 1:2 to about 2:1 at a temperature of from about 220°C to about 320°C under an inert atmosphere to form an intermediate adduct in a Diels-Alder reaction, wherein the second moiety is compound having a structure having a diene conjugated carbon-carbon double bond and a carboxylic acid or anhydride moiety; and

(b) esterifying the intermediate adduct with a third moiety in a molar ratio of from about 1:2 to about 2:1, wherein the third moiety is a polyhydroxy compound.

12. (Currently amended) The process for synthesizing an anti-wear compound of claim 11 ~~anti-wear compound of claim 11~~ wherein the unsaturated synthetic base oil or the unsaturated synthetic dieneophilic base oil is selected from the group consisting of unsaturated C_{12}-C_{50} alkenes, C_{12}-C_{50} dienes, naphthenic petroleum base stocks; unsaturated liquid oligomers and polymers, unsaturated polyalphaolefins, unsaturated polyacrylates, unsaturated dehydrated polyol esters; unsaturated C_{10}-C_{24} branched or straight chain fatty acids; unsaturated fatty esters having a branched or straight chain mono- or polyunsaturated C_{10}-C_{24} fatty acid esterified to a C_1-C_{24} straight or branched, saturated or unsaturated alcohol; unsaturated fatty glycol esters having a mono- or polyunsaturated C_{10}-C_{24} branched or straight chain fatty acid esterified to one or more hydroxyl sites of a polyol selected from ethyleneglycol, polyethyleneglycol, propyleneglycol, polypropyleneglycol, polyethoxylated alcohols, trimethylolpropane, pentaerythritol, dimethylolpropane, dipentaerythritol, and trimethylolethane; cyclopentene, cyclopentadiene, cyclohexene, cyclohexadiene, 3-pyrroline; substituted benzene, substituted tolune, substituted xylene, substituted quinone, substituted naphthalene, substituted anthracene, substituted pyrrole, substituted furan, substituted thiophene, substituted pyridine, substituted pyrimidine, substituted imidazole, substituted thiazole; X_1-ester-linked benzoic acid, X_1-ester-linked benzyl, X_1- ester-linked naphthenic, X_1-ester-linked phenol; a branched or straight chain mono- or polyunsaturated C_{10}-C_{24} fatty acid; and combinations thereof, wherein the substitution is a mono- or polyunsaturated C_2-C_{25} branched or straight chain alkenyl, wherein X_1- ester-linked is C_2-C_{24} straight or branched carboxylic acid side chains or a C_1-C_{24} straight or branched, saturated or unsaturated alcohols.

13. (Cancelled)

14. (Currently amended) The process for synthesizing an anti-wear compound of claim 11 ~~anti-wear compound of claim 13~~ wherein the second moiety is selected from a group consisting

of sorbic acid, sorbic anhydride, salicylic acid, salicylic anhydride, C_1-C_{10} alkyl, C_{2-10} alkenyl, or C_{1-10} alkoxy derivatives of the foregoing acids and anhydrides, and combinations thereof.

15. (Original) The process for synthesizing an anti-wear compound of claim 11 wherein the polyhydroxy compound of the third moiety is selected from the group consisting of glycerol, sorbitol, hydroxyquinone, glucose, mannose, 6-carbon sugars, pentose, fructose, 5-carbon sugars, pentaerythritol, catechol, resorcinol, hydroquinone, pyrogallol, 4,4'-dihydroxybiphenyl, 2,4-dihydroxybiphenyl, 2,2'-dihydroxybiphenyl, orthohydroxybenzene, polyhydroxyaromatic compounds having one or two phenyl rings and one or two 5-6 membered aromatic rings having substituted alkyl or alkenyl side chains (C_{2-10}) substituted with at least two hydroxyl groups, trimethylolpropane, pentaerythritol, dimethylolpropane, dipentaerythritol, trimethylolethane, ethyleneglycol, polypropyleneglycol, polyethylated alcohols, and combinations thereof.

16. (Original) The process for synthesizing an anti-wear compound of claim 11 wherein the first reaction is conducted under an inert atmosphere with full vacuum.

17. (Original) The process for synthesizing an anti-wear compound of claim 11 wherein the esterification reaction comprises reaction conditions of from about 150°C to about 230°C under an inert atmosphere and further comprises adding an esterification catalyst.

18. (Original) The process for synthesizing an anti-wear compound of claim 17 wherein the esterification catalyst is an acid catalyst.

19. (Original) The process for synthesizing an anti-wear compound of claim 18 wherein the esterification catalyst is selected from the group consisting of p-toluene sulfonic acid, hypophosphorous acid, sulfuric acid, hydrochloric acid, phosphoric acid, acid-activated clays, solid acid catalysts, acidic zeolites, and combinations thereof.

20. (Original) An anti-wear supplement composition for addition to lubricant formulas, comprising from about 1.0% to about 50% by weight of a non-phosphorous anti-wear compound, from about 0% to about 25% by weight of a phosphorous additive, from about 0% to about 10% of an extreme pressure additive, from about 0% to about 25% of a solubility stabilizer, and from about 25% to about 75% of a base oil carrier, wherein the non-phosphorous anti-wear compound comprises an intermediate adduct of a first moiety reacted in a first reaction with a second moiety to form the intermediate adduct and further esterifying the intermediate adduct with a third moiety in a molar ratio of from about 1:2 to about 2:1, wherein the first moiety is an unsaturated synthetic base oil or an unsaturated synthetic dieneophilic base oil, wherein the second moiety is a compound

having a diene conjugated carbon-carbon double bond and a carboxylic acid moiety or anhydride group, wherein the first reaction comprises mixing the first moiety with the second moiety in a molar ratio of from about 1:2 to about 2:1 at a temperature of from about 220°C to about 320°C under an inert atmosphere; and wherein the third moiety is a polyhydroxy compound.

21. (Previously presented) The anti-wear supplement composition for addition to lubricant formulas of claim 20, wherein the unsaturated synthetic base oil or the unsaturated synthetic dieneophilic base oil is selected from the group consisting of unsaturated C_{12}-C_{50} alkenes, C_{12}-C_{50} dienes, naphthenic petroleum base stocks; unsaturated liquid oligomers and polymers, unsaturated polyalphaolefins, unsaturated polyacrylates, unsaturated dehydrated polyol esters; unsaturated C_{10}-C_{24} branched or straight chain fatty acids; unsaturated fatty esters having a branched or straight chain mono- or polyunsaturated C_{10}-C_{24} fatty acid esterified to a C_1-C_{24} straight or branched, saturated or unsaturated alcohol; unsaturated fatty glycol esters having a mono- or polyunsaturated C_{10}-C_{24} branched or straight chain fatty acid esterified to one or more hydroxyl sites of a polyol selected from ethyleneglycol, polyethyleneglycol, propyleneglycol, polypropyleneglycol, polyethoxylated alcohols, trimethylolpropane, pentaerythritol, dimethylolpropane, dipentaerythritol, and trimethylolethane; cyclopentene, cyclopentadiene, cyclohexene, cyclohexadiene, 3-pyrroline; substituted benzene, substituted tolune, substituted xylene, substituted quinone, substituted naphthalene, substituted anthracene, substituted pyrrole, substituted furan, substituted thiophene, substituted pyridine, substituted pyrimidine, substituted imidazole, substituted thiazole; X_1-ester-linked benzoic acid, X_1-ester-linked benzyl, X_1- ester-linked naphthenic, X_1-ester-linked phenol; a branched or straight chain mono- or polyunsaturated C_{10}-C_{24} fatty acid; and combinations thereof, wherein the substitution is a mono- or polyunsaturated C_2-C_{25} branched or straight chain alkenyl, wherein X_1- ester-linked is C_2-C_{24} straight or branched carboxylic acid side chains or a C_1-C_{24} straight or branched, saturated or unsaturated alcohols.

22. (Cancelled)

23. (Currently amended) The anti-wear compound of ~~claim 22~~ claim 20 wherein the second moiety is selected from a group consisting of sorbic acid, sorbic anhydride, salicylic acid, salicylic anhydride, C_1-C_{10} alkyl, $C_{2\text{-}10}$ alkenyl, or $C_{1\text{-}10}$ alkoxy derivatives of the foregoing acids and anhydrides, and combinations thereof.

24. (Original) The anti-wear supplement composition for addition to lubricant formulas of claim 20, wherein the polyhydroxy compound of the third moiety is selected from the group

consisting of glycerol, sorbitol, hydroxyquinone, glucose, mannose, 6-carbon sugars, pentose, fructose, 5-carbon sugars, pentaerythritol, orthohydroxybenzene, polyhydroxyaromatic compounds having one or two phenyl rings and at least two hydroxyl groups, trimethylolpropane, polyethoxylated alcohols, and combinations thereof.

25. (Original) The anti-wear supplement composition for addition to lubricant formulas of claim 20, wherein the esterification reaction comprises reaction conditions of from about 150°C to about 230°C under an inert atmosphere and further comprises adding an esterification catalyst.

26. (Previously presented) The anti-wear supplement composition for addition to lubricant formulas of claim 25, wherein the esterification catalyst is an acid catalyst.

27. (Original) The anti-wear supplement composition for addition to lubricant formulas of claim 26, wherein the esterification catalyst is selected from the group consisting of p-toluene sulfonic acid, hypophosphorous acid, sulfuric acid, hydrochloric acid, phosphoric acid, acid-activated clays, solid acid catalysts, acidic zeolites, and combinations thereof.

28. (Original) A crankcase oil formulation comprising from about 0.1% to about 10% of a non-phosphorous anti-wear compound, from about 0% to about 0.2% of a phosphorous additive, from about 0% to about1% of an extreme pressure additive, from about 3% to about 10% of a viscosity index improver, from about 0.1% to about 1.0% of an anit-oxidant, from about 0.1% to about 1.0% of a pour point depressant, from about 2.0% to about 5.0% of a dispersant, from about 1.0% to about 5.0% of a detergent, and from about 80% to about 95% of a base oil carrier, wherein the non-phosphorous anti-wear compound comprises an intermediate adduct of a first moiety reacted in a first reaction with a second moiety to form the intermediate adduct and further esterifying the intermediate adduct with a third moiety in a molar ratio of from about 1:2 to about 2:1, wherein the first moiety is an unsaturated synthetic base oil or an unsaturated synthetic dieneophilic base oil, wherein the second moiety is a compound having a diene conjugated carbon-carbon double bond and a carboxylic acid moiety or anhydride group, wherein the first reaction comprises mixing the first moiety with the second moiety in a molar ratio of from about 1:2 to about 2:1 at a temperature of from about 220°C to about 320°C under an inert atmosphere; and wherein the third moiety is a polyhydroxy compound.

29. (Previously presented) The crankcase oil formulation of claim 28, wherein the unsaturated synthetic base oil or the unsaturated synthetic dieneophilic base oil is selected from the group consisting of unsaturated C_{12}-C_{50} alkenes, C_{12}-C_{50} dienes, naphthenic petroleum base stocks;

unsaturated liquid oligomers and polymers, unsaturated polyalphaolefins, unsaturated polyacrylates, unsaturated dehydrated polyol esters; unsaturated C_{10}-C_{24} branched or straight chain fatty acids; unsaturated fatty esters having a branched or straight chain mono- or polyunsaturated C_{10}-C_{24} fatty acid esterified to a C_1-C_{24} straight or branched, saturated or unsaturated alcohol; unsaturated fatty glycol esters having a mono- or polyunsaturated C_{10}-C_{24} branched or straight chain fatty acid esterified to one or more hydroxyl sites of a polyol selected from ethyleneglycol, polyethyleneglycol, propyleneglycol, polypropyleneglycol, polyethoxylated alcohols, trimethylolpropane, pentaerythritol, dimethylolpropane, dipentaerythritol, and trimethylolethane; cyclopentene, cyclopentadiene, cyclohexene, cyclohexadiene, 3-pyrroline; substituted benzene, substituted tolune, substituted xylene, substituted quinone, substituted naphthalene, substituted anthracene, substituted pyrrole, substituted furan, substituted thiophene, substituted pyridine, substituted pyrimidine, substituted imidazole, substituted thiazole; X_1-ester-linked benzoic acid, X_1-ester-linked benzyl, X_1- ester-linked naphthenic, X_1-ester-linked phenol; a branched or straight chain mono- or polyunsaturated C_{10}-C_{24} fatty acid; and combinations thereof, wherein the substitution is a mono- or polyunsaturated C_2-C_{25} branched or straight chain alkenyl, wherein X_1-ester-linked is C_2-C_{24} straight or branched carboxylic acid side chains or a C_1-C_{24} straight or branched, saturated or unsaturated alcohols.

30. (Cancelled)

31. (Currently amended) The crankcase oil formulation ~~formulatin~~ of claim 28 wherein the second moiety is selected from a group consisting of sorbic acid, sorbic anhydride, salicylic acid, salicylic anhydride, C_1-C_{10} alkyl, $C_{2\text{-}10}$ alkenyl, or $C_{1\text{-}10}$ alkoxy derivatives of the foregoing acids and anhydrides, and combinations thereof.

32. (Original) The crankcase oil formulation of claim 28 wherein the polyhydroxy compound of the third moiety is selected from the group consisting of glycerol, sorbitol, hydroxyquinone, glucose, mannose, 6-carbon sugars, pentose, fructose, 5-carbon sugars, pentaerythritol, orthohydroxybenzene, polyhydroxyaromatic compounds having one or two phenyl rings and at least two hydroxyl groups, trimethylolpropane, polyethoxylated alcohols, and combinations thereof.

33. (Original) The crankcase oil formulation of claim 28 wherein the esterification reaction comprises reaction conditions of from about 150°C to about 230°C under an inert atmosphere and further comprises adding an esterification catalyst.

34. (Original) The crankcase oil formulation of claim 33 wherein the esterification catalyst is an acid catalyst.

35. (Original) The crankcase oil formulation of claim 34 wherein the esterification catalyst is selected from the group consisting of p-toluene sulfonic acid, hypophosphorous acid, sulfuric acid, hydrochloric acid, phosphoric acid, acid-activated clays, solid acid catalysts, acidic zeolites, and combinations thereof.

36. (Currently amended) The ~~An~~ anti-wear compound of claim 10, wherein the first moiety, second moiety, and third moiety are trimethylol propane trioleate, sorbic acid, and sorbitol, respectively ~~comprising:~~

~~reacting a first moiety with a second moiety in a molar ration of from about 1:2 to about 2:1 at a temperature of from about 22°C to about 320°C under an inert atmosphere to form an intermediate adduct; and~~

~~esterfying the intermediate adduct with a third moiety in a molar ratio of from about 1:2 to about 2:1 wherein the first moiety is an unsaturated synthetic base oil or an unsaturated synthetic dieneophilic base oil, the second moiety is a structure having a diene conjugated carbon carbon double bond and a carboxylic acid or anhydride moiety, and the third moiety is a polyhydroxy compound and wherein the anti-wear compound is made from the first moiety, second moiety and third moiety compounds selected from the group consisting of respectively in order for each anti-wear compound trimethyol propane trioleate sorbic acid sorbitol, trimethol propane trioleate-sorbitol-sorbate, and trimethyol propane trioleate sorbid acid hydroquinone.~~